REMARKS

By this amendment, claims 3, 12, 14-16, 27-30, 33-34 and 39 have been amended in the application. Currently, claims 3, 5, 7, and 9-39 are pending in the application.

Claims 3-10 were provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 3-15 of copending Application No. 10/820,025 in view of Henry et al. (U.S. Patent No. 6,156,390). Applicants respectfully submit that a Terminal Disclaimer for this rejection was already filed on August 14, 2006, and the Examiner withdrew this rejection in the office action mailed on September 25, 2006. It is respectfully submitted that this rejection should be withdrawn in view of the submission of the previous Terminal Disclaimer.

Claims 3, 12, 14-16, 27-30, 33-34 and 39 were objected to because the following informalities: the phrase "electroless plating powder" in claim 3 should be changed to "electroless plated powder". By this amendment, claim 3 has been amended as suggested by the Examiner.

In claims 3, 12, 14-16, 27-30, 33-34 and 39, the phrase "a second solution, which contains a reducing agent-containing

solution" should be changed to "a second solution, which contains a reducing agent". By this amendment, claims 3, 12, 14-16, 27-30, 33-34 and 39 have been amended as suggested by the Examiner.

In claim 3, 16, 33 and 34, the phrase "initial thin nickel films" was suggested to be changed to "initial thin nickel film". By this amendment, claims 3, 16, 33 and 34 have been amended as suggested by the Examiner.

In claim 34, the word "(II)" was suggested to be changed "(III)". By this amendment, claim 34 has been amended as suggested by the Examiner. Therefore, it is respectfully submitted that in view of these amendments, these objections have been overcome and should be withdrawn.

Claims 3, 5, 7 and 9-39 were rejected under 35 USC 103(a) as being obvious over Kawakami et al. (JP 1-242782). Also, claims 3, 5, 7 and 9-39 were rejected under 35 USC 103(a) as being obvious over Kawakami et al. in view of Weber et al. (U.S. Patent No. 6,274,241). Further, Claims 3, 5, 7 and 9-39 were rejected under 35 USC 103(a) as being obvious over Kawakami et al./Kawakami et al. in view of Weber et al./, further in view of Segawa et al. (JP 2001-316834).

These rejections are respectfully traversed in view of the enclosed Declaration under 37 CFR 1.132 showing the differences with the prior art to Kawakami et al. and the remarks below.

The present invention relates to a conductive electroless plated powder and a method for making the same. More particularly, the present invention relates to a conductive electroless plated powder provided with nickel films having improved heat resistance (see page 1, lines 7-11 of the specification).

In the nickel film of the plated powder of the present invention, many columnar structures extending in the direction of the thickness gather tightly to form a dense, homogeneous, and continuous film as shown in Fig. 1. On the other hand, in the nickel film of the conventional plated powder shown in Fig. 2, the crystal grains are rough and heterogeneous. The present inventors have found that, in the nickel film having the columnar structures as shown in Fig. 1, heat resistance is high, and the conductivity of the plated powder is not easily decreased even under high temperature conditions (see page 5, lines 9-19 of the specification).

The present invention discloses that the initial thin film formation step is carried out to deposit nickel uniformly on the

core particles and to smooth the surfaces of the core particles. In the initial thin film formation step, first, the core particles supporting the noble metal are dispersed in water thoroughly. A shear dispersing machine, such as a colloid mill or homogenizer, may be used for the dispersion. When the core particles are dispersed, for example, a dispersing agent, such as a surfactant, may be used as necessary. The aqueous suspension thus prepared is mixed and dispersed in an initial thin film-solution containing nickel ions, a reducing agent, and a complexing agent composed of an amine. Thereby, the reduction of nickel ions is started, and nickel initial thin films are formed on the surfaces of the core particles. Since the initial thin film formation step is carried out to deposit nickel uniformly on the core particles and to smooth the surfaces of the core particles, the resultant initial thin nickel film only require a small thickness which enables smoothing the surfaces of the core particles (see page 11, line 12 - page 12, line 2 of the specification).

The present invention also discloses that it is important to involve a complexing agent in the initial thin film-forming solution. By incorporating the complexing agent in the initial thin film-forming solution and by incorporating the complexing

agent in the nickel ion-containing solution, it is possible to easily form a nickel film having columnar structures (see page 12, lines 20-26 of the specification).

Independent claims 3, 16, 33 and 34 recite "(II) dispersing the core particles in an initial thin film-forming solution containing nickel ions, a reducing agent, and a complexing agent comprising an amine to prepare an aqueous suspension, and reducing the nickel ions to form initial thin nickel film on a surface of each of the core particles; and (III) adding a first solution, which contains a nickel ion-containing solution and the complexing agent, and a second solution, which contains a reducing agent, to the aqueous suspension individually and simultaneously, the aqueous suspension containing the core particles provided with the initial thin nickel films and the complexing agent to perform electroless plating so that columnar structures extending in a direction of a thickness of a nickel film are formed". These features are not shown or suggested by Kawakami et al. Weber et al. and Segawa et al. or any combination of these references.

Kawakami et al. relate to an electroless plated powder and a production process therefore (see page 1, lines 14-15 of the translation).

Kawakami et al. disclose the step of allowing a core material to trap noble metal ions, and then reducing the ions to carry the metal on the surface of the core material (see page 14, lines 19-24 and page 15, lines 5-7 of the translation).

Kawakami et al. also disclose the step of dispersing the powder of the core material in an aqueous suspension (page 16, line 11 - page 17, line 10 of the translation).

Kawakami et al. also disclose the step of adding at least two solutions constituting the electroless plating solution individually and simultaneously to the aqueous suspension to perform an electroless plating (see page 18, line 23 - page 19, line 6 of the translation).

Kawakami et al. do not disclose the steps of (II) dispersing the core particles in an initial thin film-forming solution containing nickel ions, a reducing agent, and a complexing agent comprising an amine to prepare an aqueous suspension, and reducing the nickel ions to form initial thin nickel film on a surface of each of the core particles; and (III) adding a first solution, which contains a nickel ion-containing solution and the complexing agent, and a second solution, which contains a reducing agent, to the aqueous suspension individually and simultaneously, the aqueous suspension containing the core

particles provided with the initial thin nickel films and the complexing agent to perform electroless plating so that columnar structures extending in a direction of a thickness of a nickel film are formed as claimed in independent claims 3, 16, 33 and 34.

Applicants respectfully submit that the method for producing a conductive electroless plated powder described in the present invention is different from the method described in Kawakami et al. so that the conductive electroless plated powder of the present invention is not identical to the conductive electroless plated powder of Kawakami et al.

Specifically, Kawakami et al. disclose an aged plating solution may be added to an aqueous suspension containing a powder of a core material having reduced noble metal ions thereon. However, even if an aged plating solution is added to the aqueous suspension, an initial thin film is not formed. The reason for this is as follows.

An aged plating solution contains metal ions and a reducing agent. However, although the reducing agent contained in the aged plating solution has a reducing power in a broad sense, the reducing agent does not have a high reducing power sufficient to reduce metal ions. Kawakami et al. disclose sodium hypophosphite

and the like as examples of the reducing agent. For example, regarding sodium hypophosphite, when metal ions are reduced by electroless plating using sodium hypophosphite, hypophosphite ions are changed (oxidized) to phosphite ions. Although phosphite ions have a weak reducing property, they do not have a reducing property sufficient to reduce metal ions.

In Kawakami et al., the purpose of the description of the addition of an aged plating solution to an aqueous suspension containing a powder of a core material having reduced noble metal ions thereon lies reusing unreduced metal ions and a complexing agent contained in the aged plating solution without disposing of the plating solution. However, since the reducing agent no longer has a reducing power, the reducing agent cannot be reused. In order to clarify this point, the Declaration under 37 CFR 1.132 attached in this amendment proves that an initial thin film is not formed on the surface of the core powder.

Therefore, Kawakami et al. do not disclose the step of dispersing the core particles in an initial thin film-forming solution containing nickel ions, a reducing agent, and a complexing agent comprising an amine to prepare an aqueous suspension, and reducing the nickel ions to form initial thin

nickel film on a surface of each of the core particles as claimed in the present invention.

Next, applicants respectfully submit that in Kawakami et al., a nickel ion-containing solution used in the step of electroless plating does not contain a complexing agent. Specifically, Kawakami et al. disclose that at least two solutions constituting a plating solution are individually and simultaneously added. In addition, Kawakami et al. disclose that a complexing agent can be used in the plating solution. However, Kawakami et al. do not disclose that in the two solutions of the plating solution, one of the solutions that contain metal ions contains a complexing agent. None of examples described in Kawakami et al. discloses the addition of a complexing agent to either of two solutions of the plating solution. Therefore, Kawakami et al. do not disclose the step of adding a first solution, which contains a nickel ion-containing solution and the complexing agent, and a second solution, which contains a reducing agent, to the aqueous suspension individually and simultaneously, the aqueous suspension containing the core particles provided with the initial thin nickel films and the complexing agent to perform electroless plating so that columnar

structures extending in a direction of a thickness of a nickel film are formed as claimed in the present invention.

Also, as described above, Kawakami et al. disclose a complexing agent can be used in a plating solution. However, Kawakami et al. neither describes nor suggests that the same type of complexing agent as that contained in the aqueous suspension containing the powder of a core material having an initial thin film on the surface thereof is used as the complexing agent. None of the examples described in Kawakami et al., discloses the addition of a complexing agent to either of two solutions of the plating solution. Therefore, as described above, Kawakami et al. do not disclose the step of adding a first solution, which contains a nickel ion-containing solution and the complexing agent, and a second solution, which contains a reducing agent, to the aqueous suspension individually and simultaneously, the aqueous suspension containing the core particles provided with the initial thin nickel films and the complexing agent to perform electroless plating so that columnar structures extending in a direction of a thickness of a nickel film are formed as claimed in the present invention.

For these reasons, it is believed that Kawakami et al. do not show or suggest the present claimed features of the present

invention. Applicants also submit that Weber et al. do not make up for the deficiencies in Kawakami et al.

Weber et al. relate to a substrate, a method of nucleation, a powder, and a method for metal plating (see column 1, lines 6-7). Glass substrates in the form of plates of glass or glass powder are nucleated with palladium and then coated with a layer of nickel/tungsten (see column 3, lines 49-52).

Weber et al. also disclose that a single metal such as Ni, Cu, Ag, Au and platinum metals or metal oxide can be applied (see column 5, line 46-48).

Weber et al. do not disclose the steps of (II) dispersing the core particles in an initial thin film-forming solution containing nickel ions, a reducing agent, and a complexing agent comprising an amine to prepare an aqueous suspension, and reducing the nickel ions to form initial thin nickel film on a surface of each of the core particles; and (III) adding a first solution, which contains a nickel ion-containing solution and the complexing agent, and a second solution, which contains a reducing agent, to the aqueous suspension individually and simultaneously, the aqueous suspension containing the core particles provided with the initial thin nickel films and the complexing agent to perform electroless plating so that columnar

structures extending in a direction of a thickness of a nickel film are formed as claimed in independent claims 3, 16, 33 and 34.

Applicants respectfully submit that the Declaration under 37 CFR 1.132 submitted on March 26, 2007, and the accompanying color (and black and white) pictures (one set of each) show that when the Weber et al. process is applied to the core particles using several different conditions, no continuous Ni metal coating was obtained. Further, no columnar structures were found in any of the examples using the Weber et al. process. It is therefore believed that in view of the submitted Declaration, the claims in this application are allowable over the prior art of record.

Also, applicants respectfully submit that Weber et al. do not have enough support of the specific method for forming the nickel film on the glass powder. In other words, Weber et al. do not teach or suggest the steps of dispersing the core particles in an initial thin film-forming solution containing nickel ions, a reducing agent, and a complexing agent comprising an amine to prepare an aqueous suspension, and reducing the nickel ions to form initial thin nickel film on a surface of each of the core particles; and adding a first solution, which contains a nickel ion-containing solution and the complexing agent, and a second

solution, which contains a reducing agent, to the aqueous suspension individually and simultaneously, the aqueous suspension containing the core particles provided with the initial thin nickel films and the complexing agent to perform electroless plating so that columnar structures extending in a direction of a thickness of a nickel film are formed as claimed in independent claims 3, 16, 33 and 34.

Also, applicants respectfully submit that there is no motivation to combine the method described in Kawakami et al. and Weber et al. because none of the prior art references teach or suggest the method for providing columnar structures as described in the present invention.

On the other hand, the purposes of the present invention are to provide the columnar structures so that the presently claimed method is necessary. Therefore, it would not have been obvious to combine Kawakami et al. and Weber et al. because there is no motivation to combine these methods discussed in Kawakami et al. and Weber et al.

For these reasons, it is believed that Weber et al. do not show or suggest the present claimed features of the present invention. Applicants also submit that Segawa et al. do not make up for the deficiencies in Kawakami et al. and Weber et al.

Segawa et al. relate to apparatus for electroless plating and method for forming conductive film.

Segawa et al. disclose to provide an apparatus for an electroless plating capable of suppressing a change of a plating liquid with time and carrying out electroless plating homogeneously and accurately, and provide a method for forming a conductive film (abstract).

Segawa et al. do not disclose the steps of (II) dispersing the core particles in an initial thin film-forming solution containing nickel ions, a reducing agent, and a complexing agent comprising an amine to prepare an aqueous suspension, and reducing the nickel ions to form initial thin nickel film on a surface of each of the core particles; and (III) adding a first solution, which contains a nickel ion-containing solution and the complexing agent, and a second solution, which contains a reducing agent, to the aqueous suspension individually and simultaneously, the aqueous suspension containing the core particles provided with the initial thin nickel films and the complexing agent to perform electroless plating so that columnar structures extending in a direction of a thickness of a nickel film are formed as claimed in independent claims 3, 16, 33 and 34.

It is therefore respectfully submitted that Kawakami et al., Weber et al., and Segawa et al., individually or in combination, do not teach, disclose or suggest the presently claimed invention and it would not have been obvious to one of ordinary skill in the art to combine these references to render the present claims obvious.

In view of foregoing claim amendments and remarks, it is respectfully submitted that the application is now in condition for allowance and an action to this effect is respectfully requested.

If there are any questions or concerns regarding the amendments or these remarks, the Examiner is requested to telephone the undersigned at the telephone number listed below.

Respectfully submitted,

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